

[54] OCULAR TREATMENT

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**Related U.S. Application Data**

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[58] Field of Search ..... 128/200.14; 604/20,  
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[56] **References Cited**

**U.S. PATENT DOCUMENTS**

2,534,310 12/1950 Silverman ..... 604/295  
2,698,015 12/1954 Brown ..... 604/295  
3,934,585 1/1976 Maurice ..... 604/295

4,340,047 7/1982 Tapper et al. .... 604/20  
4,398,909 8/1983 Portnoff ..... 604/295  
4,564,016 1/1986 Maurice et al. .... 604/20  
4,623,337 11/1986 Maurice ..... 604/298  
4,758,237 7/1988 Sacks ..... 604/294  
4,792,334 12/1988 Py ..... 604/301

**FOREIGN PATENT DOCUMENTS**

1569707 6/1980 United Kingdom .

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[57] **ABSTRACT**

A method of administering less than 20  $\mu$ l of a solution of an ophthalmically effective substance to the eye characterized in that the formulation has a viscosity and resistivity which makes it suitable for electrodynamic spraying, and the formulation is supplied to a spray nozzle wherein a sufficiently large electrical potential, relative to earth, is applied to the formulation that a sufficient electrical gradient is provided at the spray nozzle to atomize the formulation as a spray of electrically charged droplets. Also liquid solution formulations of ophthalmically effective substances for use in the method of the invention; and electrodynamic spraying apparatus, convenient for hand held use, for use in the method of the invention.

**9 Claims, 5 Drawing Sheets**

